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PHYSICS NMDCAT

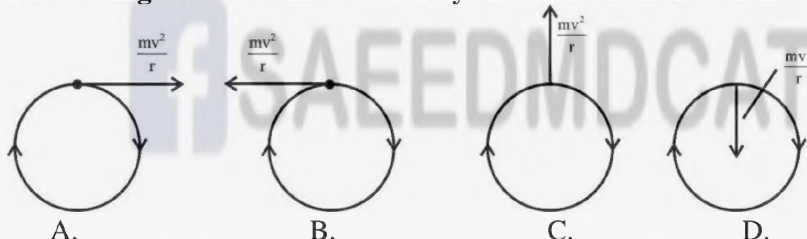
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TOPIC WISE TEST (UNIT-3)

TOPICS:

✓ Rotational and Circular Motion

- Q. 1** A particle is moving along a circular path with uniform speed. What is the angle between instantaneous velocity and acceleration?
- A. 45° B. 0°
C. 180° D. 90°
- Q. 2** The centripetal force required to keep the body in circular path is F . What would be centripetal force if radius becomes two times (keeping linear speed constant)
- A. $2F$ B. $F/2$
C. $4F$ D. $F/4$
- Q. 3** The force required to move a body of mass 1kg with velocity 10ms^{-1} along a circular path of radius 0.1m is
- A. 100N B. 1000 N
C. 1N D. Zero
- Q. 4** If a particle moves in a circle, making equal angles in equal time its velocity
- A. Remains constant B. Changes in direction only
C. Changes in magnitude only D. Changes both in magnitude and direction
- Q. 5** A particle moving in the a horizontal circle with constant angular velocity will have
- A. Constant linear momentum but varying energy
B. Constant energy but varying linear momentum
C. Neither linear momentum nor energy constant
D. Both speed and linear velocity constant
- Q. 6** A string can withstand a tension of 25N . What is the greatest speed at which a body of mass 1 kg can be whirled in a horizontal circle using 1m length of the string?
- A. 10ms^{-1} B. 7.5ms^{-1}
C. 5ms^{-1} D. 2.5ms^{-1}
- Q. 7** A particle is moving along a circular path of radius ' R ' with uniform speed of 1 ms^{-1} , the time taken to complete one rotation is _____ sec.
- A. πR B. $\frac{\pi R}{2}$
C. $2\pi R$ D. $4\pi R$
- Q. 8** If the radius of the circular path of a particle is quadrupled without changing its frequency of rotation, then centripetal force on it is
- A. halved B. doubled
C. quadrupled D. unchanged
- Q. 9** A spherically-shaped satellite of mass m and radius r is moving around the earth in a circular orbit of radius r with constant speed v . Which of the following represents the force acting on the satellite as seen by an observer on the earth?



- Q. 10** Which of the following statements is false for a particle moving in a circle with a constant angular speed?



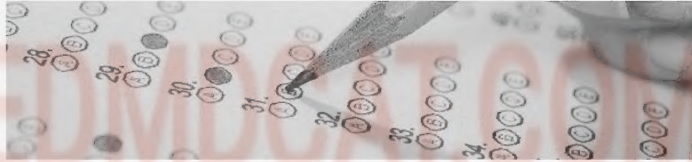
- A. The velocity vector is tangent to the circle
B. The acceleration vector is tangent to the circle
C. The acceleration vector points to the centre of the circle
D. the velocity and acceleration vectors are perpendicular to each other.
- Q. 11 In uniform circular motion, the factor that remains constant is**
A. Linear velocity
B. Speed
C. Acceleration
D. All of these
- Q. 12 The angular speed of fly wheel making 120 rev / min is _____ in (rad/sec).**
A. π
B. 2π
C. 4π
D. $4\pi^2$
- Q. 13 A point on the rim of a wheel 400 cm in diameter has a velocity of 1600 cms^{-1} . The angular velocity of the wheel is**
A. 6 rad/s
B. 2 rad/s
C. 4 rad/s
D. 8 rad/s
- Q. 14 The direction of angular velocity of a body moving in a circle is**
A. Towards the axis of rotation
B. Away from the axis of rotation
C. Along the axis of rotation
D. Above the axis of rotation
- Q. 15 A body is rotating clockwise with decreasing angular velocity. Its angular acceleration is directed**
A. Into the plane of paper
B. Along the radius
C. Out of the plane of paper
D. Along the tangent to the circle
- Q. 16 A satellite orbiting around the earth is an example of**
A. Circular motion
B. Vibratory motion
C. Rectilinear velocity
D. All of these
- Q. 17 If a wheel of radius r turns through an angle of 30° , then the distance through which any point on its rim moves is**
A. $\frac{\pi}{3}r$
B. $\frac{\pi}{6}r$
C. $\frac{\pi}{30}r$
D. $\frac{\pi}{180}r$
- Q. 18 An object of mass of 2 kg rotates at constant speed in a horizontal circle of radius 5 m. The time for one complete revolution is 3 s. What is the magnitude of the resultant force acting on the object?**
A. $\frac{4\pi^2}{9}N$
B. $\frac{40\pi^2}{9}N$
C. $\frac{100\pi^2}{9}N$
D. $\frac{400\pi^2}{9}N$
- Q. 19 A wheel from 1 m diameter makes 60 rev/min. The linear speed of a point on its rim in m/s is**
A. π
B. $\frac{\pi}{2}$
C. 2π
D. 3π
- Q. 20 What is the speed of the tip of second's hand of a clock if its length is 10 cm**
A. 1.05 cms^{-1}
B. 2.05 cms^{-1}
C. 1.05 m/s
D. 3.05 cms^{-1}
- Q. 21 A particle of rigid body is at a distance 0.1 m from axis of rotation to rotate with linear speed 3 m/s. What is angular speed of the rigid body**
A. 0.3 rad/s
B. 30 rads^{-1}
C. 3 rad s^{-1}
D. 1.5 rad/s
- Q. 22 A car of mass 1000 kg is moving with speed 72 km/h in a circular track of radius 100 m. The centripetal force acting on it is**
A. 4 N
B. 400 N
C. 40 N
D. 4000 N



- Q. 23 A particle of rigid body is at a distance 0.1 m from axis of rotation to rotate with linear speed 3 m/s. What is angular speed of the rigid body
A. 0.3 rad/s
B. 30 rad/s⁻¹
C. 3 rad s⁻¹
D. 1.5 rad/s
- Q. 24 A body moves in a circle of radius 4 m with constant speed 8 m/s experiences centripetal force 128 N. What is the mass of body?
A. 2 Kg
B. 8 Kg
C. 4 Kg
D. 16 Kg
- Q. 25 If the body is moving in a circle of radius r with a constant speed v, its angular velocity is
A. v²/r
B. v/r
C. vr
D. r/v
- Q. 26 A motor cyclist going round in a circular track at constant speed has
A. Constant linear velocity
B. Constant angular velocity
C. Constant acceleration
D. Constant force
- Q. 27 A body is moving along a circular path with variable speed. It has
A. a radial acceleration
B. a tangential acceleration
C. zero acceleration
D. both tangential and radial accelerations
- Q. 28 A particle of mass m is executing uniform circular motion on a path of radius r. If P is the magnitude of its linear momentum, then, the radial force acting on the particle is,
A. pmr
B. $\frac{rm}{p}$
C. $\frac{mp^2}{r}$
D. $\frac{p^2}{rm}$
- Q. 29 A wheel rotates with a constant angular velocity of 600 r.p.m. What is the angle through which the wheel rotates in one second?
A. 5π radian
B. 20π radian
C. 15π radian
D. 10π radian
- Q. 30 Angular velocity of an hour hand of a watch
A. $\frac{\pi}{43200}$ rad/s
B. $\frac{\pi}{21600}$ rad/s
C. $\frac{\pi}{30}$ rad/s
D. $\frac{\pi}{1800}$ rad/s
- Q. 31 Centripetal force in vector form can be expressed as
A. $\vec{F} = \frac{mv^2}{r}$
B. $\vec{F} = \frac{mv^2}{r} \vec{r}$
C. $\vec{F} = m\omega^2 \vec{r}$
D. $\vec{F} = \frac{mv^2}{\vec{r}} \vec{r}$
- Q. 32 If a particle moves with uniform speed that its tangential acceleration will be
A. zero
B. constant
C. infinite
D. none of these
- Q. 33 A particle comes round a circle of radius 1 m once. The time taken by it is 10 sec. The average velocity of motion is
A. 0.2 πm/s
B. 2 πm/s
C. 2 m/s
D. Zero
- Q. 34 Centripetal acceleration can be expressed as
A. $\frac{v^2}{r}$
B. vω
C. rω²
D. All of these
- Q. 35 A particle is moving on a circular path with constant speed, then its acceleration will be
A. Zero
B. External radial acceleration
C. Internal radial acceleration
D. Constant acceleration



- Q. 36 A 500 kg car takes a round turn of radius 50 m with a velocity of 36 km/hr. The centripetal force is
A. 250 N
B. 750 N
C. 1000 N
D. 1200 N
- Q. 37 What is the value of linear velocity, if $\vec{\omega} = 3\hat{i} - 4\hat{j} + \hat{k}$ and $\vec{r} = 5\hat{i} - 6\hat{j} + 6\hat{k}$
A. $6\hat{i} + 2\hat{j} - 3\hat{k}$
B. $-18\hat{i} - 13\hat{j} + 2\hat{k}$
C. $4\hat{i} - 13\hat{j} + 6\hat{k}$
D. $6\hat{i} - 2\hat{j} + 8\hat{k}$
- Q. 38 The angular velocity of a wheel is 70 rad/sec. If the radius of the wheel is 0.5 m, then linear velocity of the wheel is
A. 70 m/s
B. 35 m/s
C. 30 m/s
D. 20 m/s
- Q. 39 A car is moving with high velocity when it has a turn. A force acts on it outwardly because of
A. Centripetal force
B. Centrifugal force
C. Gravitational force
D. All the above
- Q. 40 2 radians = -----
A. 114.6°
B. 57.3°
C. 75.3°
D. 37.5°
- Q. 41 A car travels north with a uniform velocity. It goes over a piece of mud which sticks to the tyre. The particles of the mud, as it leaves the ground are thrown
A. Vertically upwards
B. Vertically inwards
C. Towards north
D. Towards south
- Q. 42 Angle between centripetal acceleration and radius vector is
A. 90°
B. 180°
C. 0°
D. 45°
- Q. 43 The angular speed of a flywheel making 180 rpm is
A. $2\pi \text{ rads}^{-1}$
B. $4\pi \text{ rads}^{-1}$
C. $6\pi \text{ rads}^{-1}$
D. $3\pi^2 \text{ rads}^{-1}$
- Q. 44 In circular motion, if the angular velocity and angular acceleration becomes parallel, then the motion becomes:
A. Slower
B. Faster
C. Constant
D. Both A and C
- Q. 45 An object is moving along a circular path of radius 4m. What will be its angular displacement if it moves 14m on this circular path?
A. 5.5 radians
B. 5.0 radians
C. 3.5 radians
D. 4.5 radians
- Q. 46 For a particle in a non-uniform accelerated circular motion
A. velocity is radial and acceleration is transverse only
B. velocity is transverse and acceleration is radial only
C. velocity is transverse and acceleration has both radial and transverse components
D. velocity is radial and acceleration has both radial and transverse components
- Q. 47 For a particle in circular motion the centripetal acceleration is
A. may be more or less than its tangential acceleration
B. more than its tangential acceleration
C. equal to its tangential acceleration
D. less than its tangential acceleration
- Q. 48 A string breaks if its tension exceeds 10 newtons. A stone of mass 250 gm tied to this string of length 10 cm is rotated in a horizontal circle. The maximum angular velocity of rotation can be
A. 20 rad/s
B. 40 rad/s
C. 100 rad/s
D. 200 rad/s
- Q. 49 If a cycle wheel of radius 0.4m completes one revolution in one second, then acceleration of the cycle is
A. $0.4\pi \text{ ms}^{-2}$
B. $0.8\pi \text{ ms}^{-2}$
C. $0.4\pi^2 \text{ ms}^{-2}$
D. $1.6\pi^2 \frac{m}{s^{-2}}$



Q. 50 The angle described in 2sec by an object rotating at a rate of 600 rpm is

A. 20π rad

B. $40\pi \text{ rad}$

C. 5π rad

D. zero

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Chemistry

C	11 B	21 B	31 B	41 D
A	12 B	22 C	32 D	42 D
C	13 B	23 D	33 C	43 D
B	14 D	24 B	34 C	44 B
D	15 C	25 A	35 B	45 B
D	16 C	26 C	36 B	46 A
C	17 A	27 C	37 B	47 C
C	18 A	28 B	38 C	48 B
C	19 D	29 A	39 B	49 B
A	20 B	30 B	40 D	50 D

Physics

D	11 B	21 B	31 B	41 D
B	12 C	22 D	32 A	42 B
B	13 D	23 B	33 D	43 C
B	14 C	24 B	34 D	44 B
B	15 C	25 B	35 C	45 C
C	16 A	26 B	36 C	46 C
C	17 B	27 D	37 B	47 A
D C	18 B	28 D	38 B	48 A
D	19 A	29 B	39 B	49 D
B	20 A	30 B	40 A	50 B

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